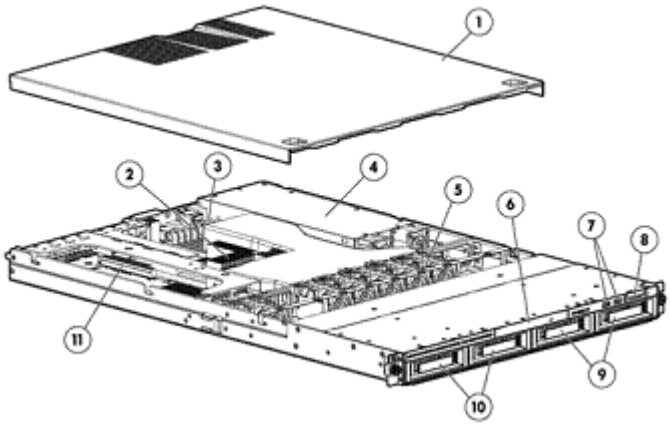
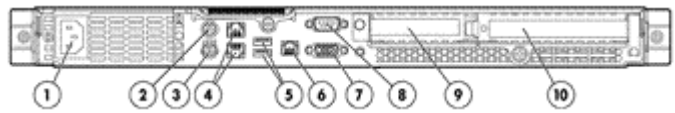
Overview

From content kit





Front View:

1. Access panel
2. Quad-Core Intel® Xeon® E5405 2.00GHz processor (supports up to two)
3. Eight PC2-5300 (DDR2-667) fully buffered DIMM memory slots
4. Power supply (650 Watts)
5. System fans
6. DVD-ROM drive
7. Two USB ports
8. Power on/off & system LEDs
9. Four (4) 3.5" hot-plug SAS/SATA hard drive bays
10. Four (4) 3.5" hot-plug SAS/SATA hard drive bays
11. Two PCIe x16 Gen2 expansion slots (one open)

Rear View:

1. Power Supply cable socket
2. PS/2 Mouse Port
3. PS/2 Keyboard Port
4. Two GbE LAN ports for NIC 1 and NIC 2 (RJ-45)
5. Rear USB 2.0 Ports
6. Lights Out 100i port for remote management
7. Video Port
8. Serial Port
9. Low Profile PCIe Slot Cover (x16 slot open)
10. Full-sized PCIe Slot (occupied by Smart Array E200 controller)

What is a ProLiant Storage Server?

ProLiant Storage Servers are enhanced Windows-powered file and print server solutions for small or medium business, branch office, workgroup, or data center IT environments. These network storage devices are built on industry-standard HP ProLiant servers and come with either Microsoft Windows Storage Server 2003 R2 or Windows Unified Data Storage Server 2003 operating system pre-installed. Like many Network Attached Storage (NAS) devices, they support heterogeneous file serving environments and are pre-configured to install in minutes. And since they're Windows-based, network integration is easy, your antivirus and backup applications run right on the box, and management has a familiar look and feel. So you can add storage to your network quickly and spend less time on storage management, then get back to what matters most: running your business.

Overview

What's New

- Create, migrate, manage, and protect shared storage without the need for storage expertise using All-in-One Storage Manager (HP ASM) Software, which is now included with all DL160 G5 Storage Servers. HP ASM is designed for IT generalists and is like getting a storage expert in the box. It includes tools to quickly and easily migrate and manage data using automated best practice settings, and you can enable optional features within HP ASM by installing Microsoft iSCSI Software Target, HP Data Protector Express Software, and/or HP Storage Mirroring Software.

Go to: http://www.hp.com/go/simplestorage for more information.

Highlights

The HP ProLiant DL160 G5 Storage Server is a Windows-powered 1U rack-mount network storage solution that delivers multi-protocol file sharing and print serving and in an affordable package. It's easy to install and manage, making it perfect for a small workgroup, small business or remote office.

- Operating System:
  - Microsoft Windows Storage Server 2003 Release 2, Standard x64 Edition with HP All-in-One Storage Manager
- Processors:
  - Quad-core Intel® Xeon® processor E5405 2.00GHz
  - One processor standard; up to 2 supported
- Memory:
  - 1GB (2 x 512MB) standard (640GB SATA model)
  - 2GB (2 x 1GB) standard (1TB, 2TB, 3TB SATA and 1.2TB SAS models)
- Storage Controller:
  - Smart Array E200/128MB Controller with BBWC
- Drive Support:
  - Four internal drive bays (3.5" Large Form Factor) that support hot-plug SATA or SAS HDDs
    - 4 x 160GB SATA LFF (640GB SATA model)
    - 4 x 250GB SATA LFF (1TB SATA model)
    - 4 x 500GB SATA LFF (2TB SATA model)
    - 4 x 750GB SATA LFF (3TB SATA model)
    - 4 x 300GB SAS LFF (1.2TB SAS model)
  - DVD-ROM drive to support System Restore
- Network Controller:
  - Two embedded NC105i PCIe Gigabit Server Adapters
- Expansion Slots:
  - Full-length, full-height PCIe x16 slot (occupied by Smart Array E200/128MB controller)
  - Half-length, low-profile PCIe x16 slot
- Redundancy:
  - Hot-plug SAS/SATA hard disk drives
- Management:
  - HP All-in-One Storage Manager Software
    - File share creation and scheduled snapshots included
    - iSCSI features require optional installation of Microsoft iSCSI Software Target
    - Data protection features require optional installation of HP Data Protector Express Software
    - Streamlined data replication features require optional installation of HP Storage Mirroring Software
  - Microsoft Management Console (MMC)-based user interface
  - Remote system management via Remote Desktop or Telnet
  - HP ProLiant Lights-Out 100i remote management - Advanced Pack included
- Form Factor:
  - Rack (1U), (1.75-inch)

Overview

- Warranty:
  - Protected by HP Services and a worldwide network of resellers and service providers. One-year Next Business Day, on-site limited global warranty (one year parts, one year labor, one year on-site support). Certain restrictions and exclusions apply.

Features and Benefits

Go from out-of-the-box to file serving in minutes, not hours	The Windows-powered operating system is pre-installed and user storage is pre-configured, so it's a quick, secure, and easy way to add storage and print services to your small/remote office network.
A single centralized file server platform to manage and protect	Consolidate islands of direct-attached storage or low-capacity NAS devices to one easy-to-use Windows platform, or create a scalable disk-based backup or replication target.
Multi-protocol file serving	You can deploy in wide range of heterogeneous file serving environments with support for SMB/CIFS, NFS, HTTP, FTP, and WebDAV protocols.
Seamless integration into your Windows environment	It's running Windows, so it integrates seamlessly into your Active Directory and DFS environments, runs your favorite antivirus and backup applications, and limits your learning curve with its familiar user interface.
New! All-in-One Storage Manager for ProLiant Storage Servers	Create, migrate, manage, and protect shared storage without the need for storage expertise using All-in-One Storage Manager (HP ASM) Software, which is now included with all DL160 G5 Storage Servers. HP ASM is designed for IT generalists and is like getting a storage expert in the box. It includes tools to quickly and easily migrate and manage data using automated best practice settings, and you can enable optional features within HP ASM by installing Microsoft iSCSI Software Target, HP Data Protector Express Software, and/or HP Storage Mirroring Software
Intelligent storage services	Make more efficient use of storage space using the file de-duplicating Single-instance Storage (SIS) feature and enjoy the benefits of other storage-specific tools like Indexed Search, SharePoint® Services support, Quotas, File Screening, Storage Reporting, and Distributed File System (DFS) Replication.
Remote manageability	You can manage and troubleshoot from almost anywhere at both the operating system level (with Remote Desktop or HTTPS) and at the hardware component level (using Lights-Out 100i remote management).
HP ProLiant industry-standard hardware	Relax--your investment is protected because you're not locked into a proprietary platform. The compact 1U rack mount platform features quad-core processing and supports four SATA or SAS 3.5" internal hard drives.
Optional data services that integrate with HP All-in-One Storage Manager	Upgrade to host block-based storage for Exchange, SQL or other applications with Microsoft® iSCSI Software Target; backup to disk, tape, or other removable media with HP Data Protector Express Software; and replicate data on a scheduled basis to another system using HP Storage Mirroring Software.

Standard Features

Operating System

Microsoft Windows Storage Server 2003 R2, Standard x64 Edition

- 64-bit processing (compatible with 32-bit applications)
- Optimized for File Serving: Up to 20% faster file serving performance than a general-purpose Windows Server 2003 R2 installation on the same hardware.
- HP-enhanced File Server Management Console: Features the familiar look and feel of the Microsoft Management Console (MMC).
- HP Rapid Start-up Wizard: Simplifies and accelerates new device deployment by walking you through basic system settings step-by-step.
- Single-instance Storage (SIS): Recovers up to 35% of disk space by de-duplicating files and reducing the amount of redundant data stored. Identifies identical files, stores a single copy of the file in a central repository, and replaces the files with pointers to the file in the SIS common store.
- Search Enhancements: Indexing Service extracts the information from a set of documents and organizes it in a way that makes it quick and easy to access that information through the Search function for computers running Windows 2000 or Windows XP.
- File Server Resource Manager (FSRM): Provides both on-demand and scheduled reports detailing storage use, allows administrators to create and manage folder and volume quotas, and permits both name-based screening of files and allowing/disallowing file creation on specified folder trees.
- Windows SharePoint® Services: A powerful Web-based team collaboration environment that provides an integrated portfolio of collaboration and communication services designed to connect people, information, processes, and systems.
- Distributed File System (DFS) Management Console: Updated DFS namespace failover, failback and prioritization controls.
- Distributed File System Replication (DFS-R): State-based, multi-master replication engine that supports replication scheduling and bandwidth throttling. DFS-R uses a new compression algorithm that efficiently updates files over limited bandwidth networks by replicating only the changes needed to ensure global file consistency.
- Full support of Volume Shadow Copy Service, which creates point-in-time copies of files and folders at predetermined time intervals that can then be accessed from client computers.
- Unlimited Client Access Licenses (CALs) included
- Microsoft Services for Network File System (NFS)
- Support for multiple file serving protocols, including SMB/CIFS, NFS, HTTP, FTP, WebDAV, and AppleTalk
- Print Management Console: Manage multiple printers (license for unlimited printer support) from a single console, whether locally or over the WAN
- Support for any number of SATA or SAS drives and multiple network ports

HP All-in-One Storage Manager Software

This easy-to-use, integrated storage management tool works from an application point-of-view and can help you orchestrate the many aspects of your storage environment---even if you lack storage expertise. It's like having your own storage expert in the box.

- Rapid startup tools for fast and easy installation and out-of-the box configuration
- File Share creation wizard for CIFS or NFS shares with storage allocation, directory quota management, and scheduled snapshots.
- Quota monitoring and alerting per share or application.
- Remote management via Microsoft Internet Explorer or Terminal Services
- Best practice and advanced dialog improvements to HP ASM wizards grant more control to those with more storage management experience
- Support for setup and management of both internal storage as well as supported direct attached

MSA storage enclosures

- Supports management of tiered storage environments where both SAS and SATA hard drives are attached to the All-in-One Storage System either internally or in externally-attached HP StorageWorks MSA enclosures.
- You can use HP ASM to specify a dedicated, primary network--plus a secondary subnet--for your IP-based storage traffic
- Disaster recovery tools work in concert with backup applications to preserve storage subsystem settings in case they need restored after a system rebuild
- Provides end-to-end management and provisioning of iSCSI storage for non-clustered 32-bit and 64-bit Windows Server 2003 or Windows Server 2008 hosts (including derivatives like Windows Small Business Server 2008 and Windows Essential Business Server 2008) from the iSCSI Target all the way through to the host (Requires Microsoft iSCSI Software Target from HP)
- Provides management and provisioning of iSCSI storage for standards-compliant non-Windows iSCSI initiators such as VMWare, Linux, etc. (Requires Microsoft iSCSI Software Target from HP)
- Application data hosting and migration wizard using HP and Microsoft 'Best Practice' storage configurations for Microsoft Exchange 2003/2007 Storage Groups and Microsoft SQL Server 2000/2005/2008* databases (*SQL Server 2008 support requires installation of "SQL Server 2005 Backward Compatibility" option; file stream functionality not supported). (Requires Microsoft iSCSI Software Target from HP)
- Application-level capacity provisioning and online growth for shares, SQL Server and Exchange. SQL Server support includes data file and log directory provisioning and Exchange support includes Mailstore, Publicstore and log directory provisioning. (Requires Microsoft iSCSI Software Target from HP)
- Application data hosting and iSCSI Setup wizard for other 'User Defined' Application (Oracle, mySQL, VMware ESX, etc…) (Requires Microsoft iSCSI Software Target from HP)
- Data protection policy assignment (snapshots, backup, and HP StorageWorks Storage Mirroring replication) integrated into application migration and share creation wizards for data hosted on the system. (Requires HP Data Protector Express Software and/or HP StorageWorks Storage Mirroring Software)
- Data Protector Express Virtual Library (D2D) device provisioning and space management as well as support for Data Protector Express D2D2Any add-on option. (Requires HP Data Protector Express Software)
- Integration with HP StorageWorks Storage Mirroring Software to accommodate asynchronous replication of file and block data to another system. (Requires HP StorageWorks Storage Mirroring Software)
- HP ASM agents now support domain servers (including Windows Server 2008, Small Business Server 2003 and Small Business Server 2008) as application host machines

HP ASM Agent Application & OS Support Matrix

	Microsoft Windows Server 2003 SP1	Microsoft Windows Small Business Server 2003	Microsoft Windows Server 2008	Microsoft Windows Essential Business Server 2008
Microsoft Exchange 2003 SP1	•	•		
Microsoft Exchange 2007	•*	•*	•*	•*
Microsoft SQL Server 2000 SP4	•	•		
Microsoft SQL Server 2005 SP2	•	•	•	•

Standard Features

Microsoft SQL Server 2008	•**	•**	•**	•**

All application support requires installation of Microsoft iSCSI Sofware Target from HP (T4433A)
*Exchange 2007 is only supported on 64-bit Operating Systems
** SQL Server 2008 support requires installation of "SQL Server 2005 Backward Compatibility" option; file stream functionality not supported

HP ASM Feature Support Matrix

	Microsoft Windows Server 2003 SP1	Microsoft Windows Small Business Server 2003	Microsoft Windows Server 2008	Microsoft Windows Essential Business Server 2008
Data Migration	•	•	•	•
Replication (HP Storage Mirroring Software)	•	•	•	•
Backup (HP Data Protector Express Software)	•	•	•	•
Virtual Library (HP Data Protector Express Software)	•	•	•***	•***
Application-aware snapshots	•	•	•	•

*** Utilizing Virtual Library (D2D) functionality requires HP Data Protector Express Software v4.x to support Windows Server 2008

Processor

Quad-Core Intel® Xeon® E5405 (2.00GHz, 80W, 1333MHz FSB)

Cache Memory

12MB (2 x 6MB) Level 2

Chipset

Intel® 5400 Chipset

Memory

Type	PC2-5300 Fully Buffered DIMMs (DDR2-667)
Memory Protection	Advanced ECC
DIMM Sockets	8
Maximum configuration	32 GB (8 x 4 GB)
640GB SATA model	
Standard	1 GB (2 x 512MB)
1TB SATA, 2TB SATA, 3TB SATA and 1.2TB SAS models	
Standard	2 GB (2 x 1GB)

Standard Features

Network Controller

Two embedded NC105i PCIe Gigabit Server Adapters

Expansion Slots

Slot Number	Bus Speed	Bus Number*	Device Number**	Hot Plug (Y/N)	PCI Voltage	Notes
1	x16 PCI-Express Gen2	1	0	No	3.3 volts	Full-length, full height (occupied by SA E200)
2	x16 PCI-Express Gen2	6	3	No	3.3 volts	Low-profile, half-length

* Default bus assignment. Inserting cards with PCI bridges may alter the actual bus assignment number.

** Slots enumerate from lowest to highest Device ID by bus (starting with the lowest bus).

Storage Controller

Smart Array E200 Storage Controller with 128MB Battery Backed Write Cache

- RAID 0/1/5
- x4 2.5G PCI Express host interface

Storage

Hard Drives — Internal:

- 4 x 160GB SATA 7.2K LFF HDDs (640GB SATA model)
- 4 x 250GB SATA 7.2K LFF HDDs (1TB SATA model)
- 4 x 500GB SATA 7.2K LFF HDDs (2TB SATA model)
- 4 x 750GB SATA 7.2K LFF HDDs (3TB SATA model)
- 4 x 300GB 3G SAS 15K LFF DP HDDs (1.2TB SAS model)

Optical Drive — DVD-ROM drive

Maximum Internal Storage (raw)

Internal hot plug LFF SATA	3 TB	4 x 750GB SATA
Internal hot plug LFF SAS	1.2 TB	4 x 300GB SAS
Internal plus External (requires addition of Smart Array E500/256MB controller)	12TB	4 x 750GB LFF SATA int. + 12 x 750GB LFF SATA ext.

Standard Features

Interfaces

Parallel	None
Network RJ-45(Ethernet)	(2) 10/100/1000 NIC ports (plus 1 dedicated to HP ProLiant Lights Out 100i Remote Management)
Serial	1
Pointing Device (Mouse)	1
Graphics	1
Keyboard	1
USB	5 (two front, one internal, and two rear) NOTE: Please see the following URL for additional information regarding USB support: http://h18004.www1.hp.com/products/servers/platforms/usb-support.html.

Graphics

Integrated on the system board:

- 1280 x 1024 at 8bpp (bits per pixel) or 2^8 = 256 colors or
- 1024 x 768 at 16bpp (bits per pixel) or 2^16 = 65536 or 64k colors

Management

HP StorageWorks All-in-One Storage Manager (HP ASM) Software

- File share creation wizard and scheduled snapshots included
- iSCSI features including "Host an Exchange Storage Group" and "Host a SQL Server Database" wizards require optional installation of Microsoft iSCSI Software Target (T4433A)
- Data protection features including support for backup of file shares or application stores to disk, tape, or other removable media using application-aware snapshots require optional installation of HP Data Protector Express Software (BB117BA)
- Streamlined data replication for file shares or application stores requires optional installation of HP Storage Mirroring Software (T5442A); Installable 60-day demo version included

Microsoft Management Console (MMC)-based user interface (also accessible via HTTPS)

Remote system management via Remote Desktop or Telnet

HP ProLiant Lights Out 100i Remote Management with Advanced Pack standard

Lights-Out 100i Remote Management allows you or your service provider to remotely control and manage a DL160 G5 Storage Servers over a LAN or the Internet regardless of the server's state of operation.

- Remote Serial Console
- Virtual Power Button
- Environmental monitoring
- Browser access
- Command line access
- IP Configuration
- User Accounts
- System Event Log
- Network Connectivity
- Integration with HP Systems Insight Manager
- Advanced Pack: Virtual KVM graphic console, Virtual Media, Secure Socket Layer and Secure Shell Security

Standard Features

NOTE: For more information on Lights-Out 100i, please visit: http://www.hp.com/servers/lightsout.

Form Factor	Rack Mount (1U), (1.75 in/4.45 cm)	
Industry Standard Compliance	ACPI V2.0 Compliant PCI 2.2 Compliant PXE Support WOL Support Microsoft® Logo certifications IPMI 2.0, SMASH CLP compliant	
Server Power Cords	Worldwide	One Highline IEC power cord standard (for connection to a Power Distribution Unit)
Power Supply	650 Watts, auto-switching, PFC (Power Factor Correcting); non-redundant, non-hot-plug	
UPS and PDU Power Cord Matrix	Please see the UPS and PDU cable matrix that lists cable descriptions, requirements, and specifications for UPS and PDU units: http://h18004.www1.hp.com/products/servers/proliantstorage/power-protection/index.html.	
System Fans	6 system fans standard; non-redundant, non-hot-plug	

Rack Airflow Requirements

Rack 10000 series Cabinets

The increasing power of new high-performance processor technology requires increased cooling efficiency for rack-mounted servers. The 10000 Series Racks provide enhanced airflow for maximum cooling, allowing these racks to be fully loaded with servers using the latest processors.

CAUTION: If a third-party rack is used, observe the following additional requirements to ensure adequate airflow and to prevent damage to the equipment:

Front and rear doors: If your 42U server rack includes closing front and rear doors, you must allow 5,350 sq cm (830 square inches) of hole evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
Side: The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 inches)

CAUTION: Always use blanking panels to fill all remaining empty front panel U-spaces in the rack. This arrangement ensures proper airflow. Using a rack without blanking panels results in improper cooling that can lead to thermal damage.

NOTE: For additional information, refer to the Setup and Installation Guide or the Documentation CD provided with the server, or to the server documentation located in the Support section at the following URL: http://h18000.www1.hp.com/products/servers/proliantDL145/index.html

Telco Rack Support	Telco Rack Kit: NOTE: Support for all 2-post Telco racks requires the use of the standard rack kit and an additional option kit from Rack Solutions: http://www.racksolutions.com/hp

Optional Software from HP for Storage Servers

- Microsoft® iSCSI Software Target - Powerful iSCSI software target solution that provides affordable application storage provisioning, protection, and availability for small and medium office environments. The software adds block storage capability to ProLiant Storage Servers and creates a single platform that delivers file, print, and application storage services, all over existing Ethernet networks. It helps administrators consolidate storage capacity, improve storage utilization, minimize system downtime, simplify backup operations, enable rapid recovery, and provides high availability for key applications and services.

  Installing Microsoft iSCSI Software Target on a ProLiant Storage Server that supports HP All-in-One Storage Manager enables several features within HP ASM, including "Host an Exchange Storage Group" and "Host a SQL Server Database" wizards and the ability to provision and manage storage for standards-compliant non-Windows iSCSI initiators such as VMWare and Linux. Select ProLiant Storage Server models (including the DL160 G5 Storage Server) are compatible with All-in-One Storage Manager; see http://www.hp.com/go/simplestorage for more information.

  For more information on Microsoft iSCSI Software Target:
  http://h18006.www1.hp.com/products/storageworks/ms_iscsi/index.html
- HP Data Protector Express Software - HP Data Protector Express is easy-to-use data protection and disaster recovery software. It is designed for smaller environments where ease of installation, use, and installation are needed. It enables backup to disk and/or tape of data stored on a ProLiant Storage Server and disaster recovery in the event of a serious incident. A ProLiant Storage Server can also act as the Backup Server and as a target for backup of data on other LAN connected machines or data protection can be integrated into an existing Data Protector Express installation.

  Installing HP Data Protector Express on a ProLiant Storage Server that supports HP All-in-One Storage Manager enables data protection features within HP ASM, including backup of file shares or application stores using application-aware snapshots to tape, disk, or other removable media target. All ProLiant Storage Servers support using Data Protector as a backup software solution and select models (including the DL160 G5 Storage Server) are compatible with All-in-One Storage Manager; see http://www.hp.com/go/simplestorage for more information.

  For more information on HP Data Protector Express Software:
  http://www.hp.com/go/dataprotectorexpress
- HP StorageWorks Storage Mirroring Software - HP StorageWorks Storage Mirroring offers a host-based application that performs remote copy over an IP LAN/WAN. Key features include asynchronous replication that can be scheduled to a fine granular level, Logical Unit Number (LUN), file or byte level. Other features include multiple replication configuration options including peer-to-peer and many-to-one. In addition, Storage Mirroring is a very cost effective disaster recovery alternative from one host to another within a LAN, storage center, or between direct attached storage in metro offices and regional centers. Additional configurations allow replication from small office environments to ensure business continuity without an outside IT staff.

  Installing HP Storage Mirroring on a ProLiant Storage Server that supports HP All-in-One Storage Manager enables replication features within HP ASM including streamlined setup of near real-time replication of file shares or application stores to a remote target. All ProLiant Storage Servers support using HP Storage Mirroring as a host-based replication solution and select models (including the DL160 G5 Storage Server) are compatible with All-in-One Storage Manager; see http://www.hp.com/go/simplestorage for more information.

For more information on HP Storage Mirroring Software:
http://h18006.www1.hp.com/products/storage/software/sm/index.html

- HP Data Protector Software - HP Data Protector software is enterprise data protection and disaster recovery, ensuring recovery from any disruption. Data Protector integrates a variety of techniques to eliminate backup and recovery windows. The capabilities to eliminate planned downtime range from online backup and backup of open files to zero-downtime, zero-impact backup. The software provides industry-leading instant recovery as well as several disaster recovery alternatives to eliminate unplanned downtime, allowing recovery of entire data centers in minutes.

  Data Protector is enabling organizations to reduce costs by automating routine tasks to maximize the effectiveness of the data protection staff. For the price of an entry-level product, it provides the enterprise functionality customers need. Data Protector scales from single server to distributed enterprise, covering an extensive range of heterogeneous applications, operating environments and storage configurations with a single solution.

  All ProLiant Storage Servers support using Data Protector as a backup software solution.

  For more information on HP Data Protector:
  http://h18006.www1.hp.com/products/storage/software/dataprotector/index.html
- HP StorageWorks File Migration Agent - HP FMA is an automated solution designed to help simplify Windows-based file, web, and application server administration in small business to enterprise environments. This is accomplished through policy-based file migration and archive to popular storage targets, including HP StorageWorks Reference Information Storage System (RISS), HP StorageWorks File System Extender, and NAS, via Common Internet File System (CIFS).

  The following Windows Storage Server features or add-ons are currently NOT supported by HP File Archiving software:
  NOTE: Single Instance Storage (SIS) - (NOT SUPPORTED)
  NOTE: DFS-Replication (DFS-R) - (NOT SUPPORTED)
  NOTE: File Server Resource Manager (FSRM) - Content Filter, & File Screening - (NOT SUPPORTED)

  For more information: http://h18006.www1.hp.com/products/storage/software/fma/
- HP Storage Essentials NAS Manager Software - Provides comprehensive Network Attached Storage (NAS) management capabilities for HP ProLiant Storage Server. Visualize your distributed HP NAS solutions and centrally manage their capacity, performance, events, and dependencies to ensure NAS availability and performance and unify SAN and NAS management.

  For more information on the complete line of HP Storage Essential products go to:
  http://www.hp.com/go/storageessentials

Warranty

The DL160 G5 Storage Server comes with a standard 1-1-1 warranty (1 year parts exchange, 1 year labor and 1 year onsite, next business day response)

Services Included with the Product

One year of HP Software Support, standard 9x5 business hours (software technical support and software product and documentation updates).

Service and Support Upgrade options

- Response - Upgrade on-site response from next business day to same day 4-hours
- Coverage - Extend hours of coverage from 5 days x 9 hours to 7 days x 24 hours
- Duration - Select duration of coverage for a minimum period of 1year or multiple years

HP offers a portfolio of services ranging from Storage Design and Architecture that provides a complete multi-site design and implementation, to various levels of on-going maintenance support. Additionally the basic warranty service can be enhanced and/or HP Installation services can be purchased. Specifically HP Care Pack services include

Product number(s)	Care Pack	Duration	Commercial reseller channels	Direct & Enterprise channels
AJ672A AJ673A AJ674A AJ675A AJ676A	HP Software Support for Storage, 9 x 5	1 year	Bundled	Bundled
		3 years	n/a	HA106A3 - 6Z5
		4 years	n/a	HA106A4 - 6Z5
		5 years	n/a	HA106A5 - 6Z5
	HP Software Support for Storage, 24 x 7	1 year	n/a	HA106A5 - 6Z5
		3 years	n/a	HA107A1 - 6Z5
		4 years	n/a	HA107A3 - 6Z5
		5 years	n/a	HA107A4 - 6Z5
	Support Plus for Storage	1 year	UH171E	HA107A5 - 6Z5
		3 years	UH173E	HA109A1 - 6Z5
		4 years	n/a	HA109A3 - 6Z5
		5 years	n/a	HA109A4 - 6Z5
		Post Warranty	UH175PE	HA109A5 - 6Z5
	Support Plus 24 for Storage	1 year	UH172E	n/a
		3 years	UH174E	HA110A1 - 6Z5
		4 years	n/a	HA110A3 - 6Z5
		5 years	n/a	HA110A4 - 6Z5
		Post Warranty	UH176PE	HA110A5 - 6Z5
	Proactive 24 (P24)	1 year	n/a	n/a
		3 years	n/a	HA111A1 - 6Z5
		4 years	n/a	HA111A3 - 6Z5
		5 years	n/a	HA111A4 - 6Z5
	6 hour CTR	1 year	UD576E	HA105A1 - 6Z5
		3 years	UD577E	HA105A3 - 6Z5
		4 years	n/a	HA105A4 - 6Z5
		5 years	n/a	HA105A5 - 6Z5

	Installation	n/a	U7986E	HA113A1 - 5D6

HP Software Support	• Connect with HP Response Center engineers via telephone, electronic communication, or FAX for assistance in resolving software implementation or operations problems. • HP Services provides corrective support to resolve identifiable and reproducible software product problems, and to help you identify problems that are difficult to reproduce. • 9x5 coverage - Service is available during standard business hours, Monday through Friday (excluding holidays).
HP Software Support, 24 x 7	• Provides all the benefits of the regular Software Support, plus HP Services engineers are available around the clock 365 days per year.
HP Support Plus	• Increases the performance and availability of your IT infrastructure with comprehensive, consistent hardware and software services. HP Services engineers deliver onsite hardware support and over-the-phone software support 13 hours per day, 5 days per week. • Encompasses the HP ProLiant Storage Server products, selected multi-vendor hardware and provides trouble-shooting software problems which range from the Storage Server 2003 operating system to the available utilities. In addition, this service makes software updates available to you at substantial savings. • Provides recovery and re-configuration assistance of the HP ProLiant Storage Server using the recovery disk and your saved configuration file.
HP Support Plus 24	• Provides all the benefits of the regular Support Plus Care Pack, plus HP Services engineers are available to deliver onsite hardware and over-the-phone software support around-the-clock 365 days per year.
HP Proactive 24	• An integrated hardware and software support solution that combines efficient problem prevention with responsive technical assistance whenever you need it. • Improves the effectiveness of technologies across your IT infrastructure, and also, establishes a collaborative relationship between you and HP that strengthens your IT team and gives you rapid access to our expertise as issues arise

Software Product Services	• Standard HP warranty ensures Software media will be free of physical defects for a period of 90 days from delivery. • These services are available to upgrade the warranty to (1 or 3) full year of 9 hours by 5 days (or 24x7) software advisory and remedial software telephone support, new version license rights, and media and documentation distribution service.

Hardware Product Services

- Installation services
- On-site maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage
- RAID setup and performance consulting via statement of work
- Migration service consulting via statement of work

For additional hardware installation and maintenance information, please refer to the URLs listed below:
http://www.hp.com/hps/storage/ns_nas.html

HP offers a portfolio of services ranging from Storage Design and Architecture that provides a complete multi-site design and implementation, to various levels of on-going maintenance support. Additionally the basic warranty service can be enhanced and/or HP Installation services can be purchased.
Our Proactive 24 annuity service (with the SAN Module) allows continuous SAN/NAS growth by ensuring that your entire SAN/NAS is safely kept updated with analysis and recommendations on relevant, ongoing firmware (FW) changes and it ensures rapid resolution of complex SAN/NAS issues.

Our SAN Solution Service is a one-time review of your entire SAN/NAS and all the components (applications, HBAs, switches and FW, arrays etc) to ensure that all components are at tested, HP Certified levels. The HP SAN Design/Architecture Service provides as broad and as deep a review and recommendation as needed of how your SAN/NAS environment can be designed and implemented to meet your business storage needs.

The on-going support offerings include various response times (4 hour same day, next day, etc) as well as coverage periods (Monday - Friday, 24x7, 1 yr, 3 yr, etc). These services are available for both hardware and software to ensure all customer support needs are met and can be purchased from either value or volume channels.

Finally HP offers an optional migration service to assist the customer in moving to the newest product release. This may be in the form of a defined kit and service, or may alternatively be performed on a time & material basis.

HP Services allows the customer to leverage HP's experience in selecting and configuring the most widely used security features, and provides an environment that is immediately more available due to increased change control and significantly improved data security.
For more information on these and other service options, please contact any of our worldwide sales offices or visit our Web site at: http://www.hp.com/hps/storage/ns_nas.html

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Installation Services

The service deployment activities will include:

- Unpacking the product, performing initial inspection, and setting up product hardware and power connectivity
- Connecting Customer-provided cables
- Setting the network address and setting appropriate domain variables in the NAS operating system
- Configuring the storage by creating a file share
- Configuring user mapping to make the share available for access
- Creating a sample file data copy or Snapshot

Product number(s):	Care Pack	Duration	Commercial reseller channels	Direct & Enterprise channels
All	Installation for Storage (per event)	One time	Available	HA113A1 - 5D6

Components

The following brick level options/components do not have individual HP Care Pack Services. These items will be included in product HP Care Pack Services into which they are installed.

Disk Drives	Tape Drives	CD/DVD ROM	SCSI Hubs in SBBs
Bus Converters	Backplane RAID Controllers	Power Supplies	Cabling

Product Configuration Wizard

In the following you will be guided through a series of steps to help you configure your ProLiant Storage Server.
NOTE: Options ship separately and are not factory integrated.

Step 1 – Choose a Model

Select one of five available DL160 G5 Storage Server models.
NOTE: Models names are based on raw storage capacity, not available user storage.

HP ProLiant DL160 G5 Storage Server Common Specifications	Operating System	Microsoft Windows Storage Server 2003 Release 2, Standard x64 Edition with HP All-in-One Storage Manager
	Processor	Quad-Core Intel® Xeon® processor E5405 (2.00GHz, 80W, 1333MHz FSB)
	Cache Memory	12MB (2 x 6MB) Level 2
	Number of Processors	1
	Memory Type	PC2-5300 DDR2 fully buffered DIMMs (667MHz)
	Storage Controller	Smart Array E200 Storage Controller with 128MB battery-backed write cache (BBWC); occupies one PCIe slot
	Network Controller	Two embedded NC105i PCIe Gigabit Server Adapters
	Expansion Slots	Two PCIe slots: • Full-length, full-height PCIe x16 slot (occupied by Smart Array E200/128MB controller) • Half-length, low-profile PCIe x16 slot
	Optical Drive	DVD-ROM drive
	Remote Management	HP ProLiant Lights Out 100i with Advanced Pack included
	Form Factor	Rack (1U), (1.75-inch)
	Factory Racking	Factory integrates select Storage Servers with other HP products such as HP ProLiant Servers or Enterprise Virtual Arrays. NOTE: #0D1 will appear after the part number on the sales order if HP factory integration is supported.
HP ProLiant DL160 G5 640GB SATA Storage Server AJ672A	Memory	1GB (2 x 512MB)
	Internal Storage	4 x 160GB SATA 7.2K 3.5" hot-plug HDDs
HP ProLiant DL160 G5 1TB SATA Storage Server AJ673A	Memory	2GB (2 x 1 GB)
	Internal Storage	4 x 250GB SATA 7.2K 3.5" hot-plug HDDs
HP ProLiant DL160 G5 2TB SATA Storage Server AJ674A	Memory	2GB (2 x 1 GB)
	Internal Storage	4 x 500GB SATA 7.2K 3.5" hot-plug HDDs
HP ProLiant DL160 G5 3TB SATA Storage Server AJ675A	Memory	2GB (2 x 1 GB)
	Internal Storage	4 x 750GB SATA 7.2K 3.5" hot-plug HDDs

HP ProLiant DL160 G5 1.2TB SAS Storage Server AJ676A	Memory	2 GB (2 x 1 GB)
	Internal Storage	4 x 300 GB 3 G SAS 15K 3.5" DP hot-plug HDDs

Step 2 - Add Another Processor

You can add a second processor to any DL160 G5 Storage Server.

Processors	Quad-Core Intel® Xeon® processor E5405 (2.00GHz, 80W, 1333MHz FSB) Option Kit	446077-B21

Step 3 - Add More Memory

NOTE: The 640GB SATA model includes 1GB (2 x 512MB) of SDRAM standard while the 1TB SATA, 2TB SATA, 3TB SATA and 1.2TB SAS models include 2GB (2 x 1GB) standard. All models are expandable to 32GB.
NOTE: All models have a total of eight DIMM sockets. DIMM banks are active only when the corresponding processor socket is populated. See 'Memory' section of QuickSpecs below for more information on memory configuration.

Memory	1 GB FBD PC2-5300 2 x 512 MB Kit	397409-B21
	2 GB FBD PC2-5300 2 X 1 GB Kit, Low Power	461826-B21
	2 GB FBD PC2-5300 2 x 1 GB Kit	397411-B21
	4 GB FBD PC2-5300 2 x 2 GB Kit, Low Power	461828-B21
	4 GB FBD PC2-5300 2 x 2 GB Kit	397413-B21
	4 GB FBD PC2-6400 800MHz 2 x 2 GB Dual Rank Kit	484060-B21
	8 GB FBD PC2-5300 2 x 4 GB LP Kit	466440-B21
	8 GB FBD PC2-5300 2 x 4 GB Kit	397415-B21
	8 GB FBD PC2-6400 2 x 4 GB Dual Rank Kit	484062-B21

Step 4 - Add a Network Adapter

DL160 G5 Storage Servers have one low-profile PCI Express x16 slot available for additional network ports, a backup HBA, or external storage expandability.
NOTE: Choose only one expansion card.
NOTE: Multifunction Server Adapters support the installed Microsoft Windows Server 2003 Scalable Networking Pack, which enables TCP Chimney offload, Receive-side Scaling (RSS), and Network Direct Memory Access (NetDMA) features.

Network Adapters	HP NC110T PCI Express Gigabit Server Adapter	434905-B21
	HP NC360T PCI Express Dual Port Gigabit Server Adapter	412648-B21
	HP NC364T PCI Express Quad Port Gigabit Server Adapter	435508-B21
	HP NC373F PCI Express Multifunction Gigabit Server Adapter	394793-B21
	HP NC373T PCI Express Multifunction Gigabit Server Adapter	394791-B21
	HP NC380T PCI Express Dual Port Multifunction Gigabit Server Adapter	394795-B21
	HP NC382T PCI Express Dual Port Multifunction Gigabit Server Adapter	458492-B21
	HP NC522SFP Dual Port 10GbE Server Adapter NOTE: A minimum of two Gigabytes (2 GB) of server memory is required per each NC522SFP adapter.	468332-B21

Step 5 – Add More Storage

DL160 G5 Storage Servers come standard with one installed Smart Array E200 controller for internal drives. They have one low-profile PCI Express x16 slot available for additional network ports, a backup HBA, or external storage expandability.

Storage Controllers	SAS Controllers	
	Smart Array E500 Controller	
	Smart Array E500/256MB Controller	435129-B21
	SAS HBAs	
	HP SC44Ge Host Bus Adapter NOTE: For external tape support only.	416096-B21
	NOTE: Please see the following QuickSpecs for additional information: http://h18004.www1.hp.com/products/quickspecs/12617_div/12617_div.html (SC44Ge HBA)	
	SCSI HBAs	
	HP SC11Xe Host Bus Adapter	412911-B21
	HP U320e SCSI Host Bus Adapter	AH627A
	NOTE: Please see the following QuickSpecs for Technical Specifications and additional information: http://h18000.www1.hp.com/products/quickspecs/12566_div/12566_div.html (SC11Xe HBA)	
External Storage Enclosures	HP StorageWorks Modular Smart Arrays NOTE: Require addition of a Smart Array E500/256MB controller	
	HP StorageWorks 60 Modular Smart Array (MSA60) NOTE: Rack-mountable 12 drive (3.5" SAS/SATA) 2U enclosure with 3Gb/s SAS host connectivity and redundant power supplies.	418408-B21
	HP StorageWorks MSA60 1.8TB SAS HDD Bundle (MSA60 w/12 146GB 15K SAS LFF HDD)	AG822A
	HP StorageWorks MSA60 9TB SATA HDD Bundle (MSA60 w/12 750GB 15K SATA LFF HDD)	AG823A
	HP StorageWorks MSA60 3.6TB SAS HDD Bundle (MSA60 w/12 300GB 15K SAS LFF HDD)	AG824A
	NOTE: The MSA60 bundles are available in the Americas, Asia Pacific (AP) and Japan only. They are not available in Europe, Middle East and Africa.	
	HP StorageWorks 70 Modular Smart Array (MSA70) NOTE: Rack-mountable 25 drive (2.5" SAS/SATA) 2U enclosure with 3Gb/s SAS host connectivity and redundant power supplies.	418800-B21
	HP StorageWorks MSA70 1.8TB SAS HDD Bundle (MSA70 w/25 72GB 15K SAS SFF HDD)	AG825A
	HP StorageWorks MSA70 3.6TB SAS HDD Bundle (MSA70 w/25 146GB 10K SAS SFF HDD)	AG893A
	NOTE: The MSA70 bundles are available in the Americas, Asia Pacific (AP) and Japan only. They are not available in Europe, Middle East and Africa.	
	NOTE: Please see the following QuickSpecs for Technical Specifications additional	

information:
http://h18000.www1.hp.com/products/quickspecs/12245_div/12245_div.html (MSA50)
http://h18000.www1.hp.com/products/quickspecs/12627_div/12627_div.html (MSA60)
http://h18000.www1.hp.com/products/quickspecs/12652_div/12652_div.html (MSA70)

Hard Drives (External Expansion)	SAS Enterprise (ENT) Drives 3.5-inch, Hot Plug	
	HP 450GB 3G 15K 3.5-inch DP SAS ENT HDD	454232-B21
	HP 400GB 3G SAS 10K 3.5-inch DP ENT HDD	459508-B21
	HP 300GB 3G SAS 15K 3.5-inch SP HDD	431944-B21
	HP 300GB 3G SAS 15K 3.5-inch DP HDD	416127-B21
	HP 146GB 3G SAS 15K 3.5-inch SP HDD	375872-B21
	HP 146GB 3G SAS 15K 3.5-inch DP HDD	384854-B21
	HP 72GB 3G SAS 15K 3.5-inch SP HDD	375870-B21
	HP 72GB 3G SAS 15K 3.5-inch DP HDD	384852-B21
	SAS Midline (MDL) Drives 3.5-inch, Hot Plug	
	HP 1TB 7.2K 3.5-inch DP SAS MDL HDD	461137-B21
	HP 750GB 7.2K 3.5-inch DP SAS MDL HDD	461135-B21
	SAS Enterprise (ENT) Drives 2.5-inch Drives, Hot Plug	
	HP 300GB 3G 10K 2.5-inch SAS DP HDD	492620-B21
	HP 146GB 3G SAS 10K SFF SP HDD	431958-B21
	HP 146GB 3G SAS 10K SFF DP HDD	418367-B21
	HP 72GB 3G SAS 10K SFF SP HDD	375861-B21
	HP 72GB 3G SAS 10K SFF DP HDD	384842-B21
	HP 72GB 3G SAS 15K SFF SP HDD	431935-B21
	HP 72GB 3G SAS 15K SFF DP HDD	418371-B21
	HP 36GB 3G SAS 10K SFF SP HDD	375859-B21
	HP 36GB 3G SAS 15K SFF SP HDD	431933-B21
	HP 36GB 3G SAS 15K SFF DP HDD	418369-B21
	NOTE: Please see the SAS Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature: http://h18000.www1.hp.com/products/quickspecs/12244_div/12244_div.html (Worldwide)	
	SATA Midline (MDL) Drives 3.5-inch, Hot Plug	
	HP 1TB 3G SATA 7.2K 3.5-inch MDL HDD	454146-B21
	HP 750GB 3G SATA 7.2K 3.5-inch MDL HDD	458930-B21
	HP 500GB 3G SATA 7.2K 3.5-inch MDL HDD	458928-B21
	HP 250GB 3G SATA 7.2K 3.5-inch MDL HDD	458926-B21
	SATA Entry (ETY) Drives 2.5-inch, Hot Plug	
	HP 250 GB 3G 5.4K 2.5-inch SFF SATA ETY HDD	460355-B21

HP 120 GB 1.5G 5.4K 2.5inch SFF SATA ETY HDD	458924-B21
HP 60 GB 1.5 G 5.4K 2.5-inch SFF SATA HDD	379306-B21

NOTE: SATA drives have a 1 year warranty. Please see the SATA Hard Drive QuickSpecs for Technical Specifications such as capacity, height, width, interface, transfer rate, seek time, physical configuration, and operating temperature: http://h18000.www1.hp.com/products/quickspecs/12091_div/12091_div.html (Worldwide)

Step 6 - Add Optional Software

Microsoft® iSCSI Software Target from HP

Microsoft iSCSI Software Target adds block storage capability to ProLiant Storage Servers and creates a single platform that delivers file, print, and application storage services, all over existing Ethernet networks. It is a powerful iSCSI software solution that provides affordable application storage provisioning, protection, and availability for small and medium office environments. It helps administrators consolidate storage capacity, improve storage utilization, minimize system downtime, simplify backup operations, enable rapid recovery, and provides high availability for key applications and services.

Installing Microsoft iSCSI Software Target on a ProLiant Storage Server that supports HP All-in-One Storage Manager enables several features within HP ASM, including "Host an Exchange Storage Group" and "Host a SQL Server Database" wizards and the ability to provision and manage storage for standards-compliant non-Windows iSCSI initiators such as VMWare and Linux. Select ProLiant Storage Server models (including the DL160 G5 Storage Server) are compatible with All-in-One Storage Manager; see: http://www.hp.com/go/simplestorage for more information.

Microsoft iSCSI Target Software 1 LTU	T4433A

NOTE: For more information on Microsoft® iSCSI Software Target from HP: http://h18006.www1.hp.com/products/storageworks/ms_iscsi/index.html

HP Data Protector Express Software

Data Protector Express has a very simple product structure yet easily enables powerful and robust data protection and disaster recovery. The base product is the Data Protector Express Backup Server. Installing this creates the Data Protector Express Storage Domain. Options are installed to add other machines to the Data Protector Express Storage Doman for protection and to add additional functionality.

Installing HP Data Protector Express (Backup Server) on a ProLiant Storage Server that supports HP All-in-One Storage Manager enables data protection features within HP ASM, including backup of file shares or application stores using application-aware snapshots to tape, disk, or other removable media target. All ProLiant Storage Servers support using Data Protector as a backup software solution and select models (including the DL160 G5 Storage Server) are compatible with All-in-One Storage Manager; see: http://www.hp.com/go/simplestorage for more information.

HP Data Protector Express 4.0 Backup Server (base product)	BB117BA

NOTE: Please see the HP Data Protector Express QuickSpecs for additional information on adding options to HP Data Protector Express software: http://h18000.www1.hp.com/products/quickspecs/12337_div/12337_div.html (Worldwide)

HP Data Protector Express Software Options

HP Data Protector Express 4.0 Network Server Agent	BB121BA
HP Data Protector Express 4.0 Network Server Agent 3 pack	BB122BA
HP Data Protector Express 4.0 Application Online Agent	BB125BA
HP Data Protector Express 4.0 Bare Metal Disaster Recovery Option	BB128BA
HP Data Protector Express 4.0 D2Any2Any Option	BB130BA
HP Data Protector Express 4.0 Drive Expansion Option	BB133BA

NOTE: For more information on HP Data Protector Express Software: http://www.hp.com/go/dataprotectorexpress

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HP StorageWorks Storage Mirroring Software

HP Storage Mirroring Software provides host-based replication and failover to IP-based networks. Patented replication and failover technology continuously captures byte-level data changes as they occur in your production environment and replicates those changes to one or more servers in any location without geographic limitations. By replicating only the bytes that change, Storage Mirroring Software uses the absolute minimum bandwidth required to replicate customer data. Advanced features allow a customer to control bandwidth usage and queue data for replication during off-peak times if desired. The software does not need special hardware to run and utilizes existing LAN or WAN infrastructure that already exists in their environment - saving time, additional investment, and maintenance. Storage Mirroring Software is storage independent and is a great complement to ProLiant Storage Servers. The flexibility, resource optimization, and application-specific protection enable customers to solidify their data and disaster protection strategies using Storage Mirroring Software.

NOTE: An installable 60-day demo of Storage Mirroring Software is included with all ProLiant Storage Servers.

Installing HP Storage Mirroring on a ProLiant Storage Server that supports HP All-in-One Storage Manager enables replication features within HP ASM including streamlined setup of near real-time replication of file shares or application stores to a remote target. All ProLiant Storage Servers support using HP Storage Mirroring as a host-based replication solution and select models (including the DL160 G5 Storage Server) are compatible with All-in-One Storage Manager; see: http://www.hp.com/go/simplestorage for more information.

Special note about Microsoft iSCSI Software Target and replication:
All HP ProLiant Storage Servers include the Distributed File System Replication (DFS-R) feature in the pre-installed Windows Storage Server 2003 R2 and Windows Unified Data Storage Server 2003 operating systems. DFS-R is a file-based replication technology that only replicates files when they are closed. Microsoft iSCSI Software Target does not close the virtual disk files (.vhd files) while they are in use, and so these files are not replicated during normal usage when replicating using DFS-R. Therefore, if iSCSI Software Target virtual disk files need to be replicated, DFS-R should not be used, and HP StorageWorks Storage Mirroring software should be

considered instead. Storage Mirroring software asynchronously replicates each write into the file system to a secondary system, and therefore it can be used to effectively replicate iSCSI Software Target virtual disk files.

HP Storage Mirroring v5.1 Windows Media Kit	TA696A
HP Storage Mirroring NAS Edition Stock LTU	TA713A
HP Storage Mirroring NAS Edition E-LTU	TA701AAE

NOTE: For more information on HP StorageWorks Storage Mirroring Software: http://h18006.www1.hp.com/products/storage/software/sm/index.html

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HP StorageWorks X1000 Upgrade to Windows Storage Server 2008 Standard Software

Select ProLiant G5 Storage Servers with the Microsoft Windows Storage Server 2003 R2 Standard x64 Edition operating system are eligible for a software-only upgrade to the Microsoft Windows Storage Server 2008 Standard x64 Edition operating system:

- DL160 G5 Storage Servers (AJ672A, AJ673A, AJ674A, AJ675A, AJ676A)
- DL185 G5 Storage Servers (AG914A, AG915A, AG916A, AG917A, AG918A, AG919A, AG920A, AM472A)
- DL380 G5 Storage Servers (AG815A*, AG816A, AG817A*, AG818A*, AG819A*, AG820A*, AG815B, AG816B, AG817B, AG819B, AN983A, AN984A)

This upgrade requires a clean install and contains all X1000 Network Storage System features, including Microsoft iSCSI Software Target and HP X1000 Automated Storage Manager Software.

* Require replacement of 2 x 36GB mirrored drives in the first two drive slots with 2 x 72GB (or greater) drives before installation

NOTE: ML110 G5 and ML350 G5 Storage Servers are not eligible, nor are HP All-in-One Storage Systems and HP ProLiant Storage Servers older than G5.

NOTE: Some expansion cards, including HBAs and NICs, may not be supported by Windows Storage Server 2008. Check Windows Server 2008 driver availability before purchase and installation.

NOTE: Check for HP and 3rd-party software qualification with 64-bit Windows Server 2008 operating systems before purchase and installation.

HP StorageWorks X1000 Upgrade to Windows Storage Server 2008 Standard Software	TA725A

Step 7 - Add a Backup Solution

NOTE: For the complete listing of data protection offerings for HP ProLiant Storage Servers, please visit: http://www.hp.com/products1/storage/compatibility/tapebackup/NAS/index.html

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Step 8 - Order HPTS Service Care Packs

Service Care Packs or warranty upgrades enhance the base hardware warranty provided with your HP ProLiant Storage Server. The Care Packs provide support for product software and operating system with extended hours of coverage and reduced response time. And Care Packs allow the customer to budget fixed cost support rather than variable costs that include parts and labor.

Note that the standard HP warranty ensures software media will be free of physical defect for a period of 90 days from delivery. However, all ProLiant Storage Servers come with a full year of 9 hours by 5 days software advisory and remedial software telephone support, new version license rights, and media and documentation distribution service. Extended hours of coverage and additional years of service are available should the customer require more support.

See "Service and Support Upgrade options" section for more information on available Care Packs for your ProLiant Storage Server.

Memory

Standard Memory

PC2-5300 (667MHz) Fully Buffered DIMMs with Advanced ECC Capabilities

- 1GB (2 x 512MB): 640GB model
- 2GB (2 x 1GB): 1TB SATA, 2TB SATA, 3TB SATA, and 1.2TB SAS models

Maximum Memory

- 32 GB

NOTE: Memory should be installed in pairs and matched for optimum performance.
NOTE: Chart does not represent all possible memory configurations.

Memory	Slot							
	1	2	3	4	5	6	7	8
Standard (640GB SATA)--1GB	512 MB	Empty	512MB	Empty	Empty	Empty	Empty	Empty
Standard (1TB, 2TB, 3TB SATA and 1.2TB SAS)--2GB	1 GB	Empty	1 GB	Empty	Empty	Empty	Empty	Empty
Maximum (32 GB)	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB	4 GB

Memory options:

1 GB FBD PC2-5300 2X512 Kit	397409-B21
2GB FBD PC2-5300 2 X 1 GB Kit, Low Power	461826-B21
2 GB FBD PC2-5300 2X1GB Kit	397411-B21
4GB FBD PC2-5300 2 x 2 GB Kit, Low Power	461828-B21
4 GB FBD PC2-5300 2X2GB Kit	397413-B21
8 GB FBD PC2-5300 2 x 4 GB LP Kit	466440-B21
8 GB FBD PC2-5300 2X4GB Kit	397415-B21
4 GB FBD PC2-6400 800MHz 2 x 2 GB Dual Rank Kit	484060-B21
8 GB FBD PC2-6400 2 x 4 GB Dual Rank Kit	484062-B21

1, 2, 3, 4	Four Large Form Factor (LFF) 3.5" drive bays for SATA or SAS hard drives
A	DVD-ROM

Drive Support

	Quantity Supported	Position Supported	
Removable Media	1 Standard	Front	DVD-ROM Drive

Hard Drives

Hot Plug 3.5" (LFF) Serial Attached SCSI - SAS

	Quantity Supported	Position Supported	Controller
300 GB 3G SAS 15K DP	4	1-4	HP Smart Array E200/128MB Controller

Hot Plug 3.5" (LFF) Serial ATA - SATA

	Quantity Supported	Position Supported	Controller
750GB SATA 7.2K 500GB SATA 7.2K 250GB SATA 7.2K 160GB SATA 7.2K	4	1-4	HP Smart Array E200/128MB Controller

External Storage

NOTE: DL160 G5 Storage Servers come standard with one installed Smart Array E200 controller for internal drives. They have one low-profile PCI Express x16 slot available for additional network ports, a backup HBA, or external storage expandability (via Smart Array E500/256MB).

	Quantity Supported	Position Supported	Controller
Modular Smart Array 60	One per Smart Array controller recommended	External	Smart Array E500 controller
Modular Smart Array 70	One per Smart Array controller recommended	External	Smart Array E500 controller

Storage

Maximum Raw Storage Capacity

Internal SAS	1.2TB (4 x 300GB SAS Drives)
Internal SATA	3.0TB (4 x 750GB SATA Drives)
Internal plus External SATA (with addition of Smart Array E500/256MB controller and MSA60 external enclosure)	12TB raw (16 x 750 GB SATA) [1 x SA E500 connected to 1 x MSA60 full of 750 GB SATA HDDs]

Factory RAID Configuration and User Storage

	Operating System Partitions		
	Volume	RAID Level	Physical Drives
Logical Disk 1	Operating System	RAID 5	0-3
Logical Disk 2	DON'T ERASE recovery partition	RAID 5	0-3
Logical Disk 3	User Data	RAID 5	0-3

Tape Drives, Tape Autoloaders, Tape Libraries & D2D Backup

NOTE: For an up-to-date listing of the latest O/S Support details for each of the Tape Drives listed below, please see the following: http://h18000.www1.hp.com/products/quickspecs/division/10233.html (Worldwide)

NOTE: For an up-to-date listing of the latest O/S Support details for each of the Tape Autoloaders & Tape Libraries listed below, please see the following: http://h18000.www1.hp.com/products/quickspecs/division/10809.html (Worldwide)

NOTE: For complete listing of tape drive offerings see: http://www.hp.com/products1/storage/compatibility/tapebackup/ISS/index.html

NOTE: SAS Tape Drives: Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

For details on connecting tape drives to this storage server, see the following:

	Position Supported	Controller	Controller/HBA Option Kit Part Number
HP StorageWorks SCSI Tape, External LTO-1 Ultrium 232 LTO-2 Ultrium 448 LTO-2 Ultrium 460 LTO-3 Ultrium 920 LTO-3 Ultrium 960 LTO-4 Ultrium 1840 DAT 40	External	HP SC44Ge Host Bus Adapter	416096-B21

Storage

DAT 72 DAT 160 1U Rack-Mount Kit 3U Rack-Mount Kit			
HP StorageWorks USB Tape Drives, External DAT 40 USB DAT 72 USB DAT 160 USB 1U USB Rack-Mount Kit	External	USB 2.0 Port	N/A
HP StorageWorks SAS Tape Drives, External DAT 160 SAS LTO-2 Ultrium 448 SAS LTO-3 Ultrium 920 SAS 1U Rack-Mount Kit	External	HP SC44Ge Host Bus Adapter * HP Smart Array E500 Controller * Recommended	416096-B21 435129-B21
HP StorageWorks SCSI Tape Automation, External DAT 72X10 Autoloader 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096 MSL6000	External	HP U320e SCSI Host Bus Adapter NOTE: Only valid for MSL tape libraries.	AH627A
HP StorageWorks SAS Tape Automation, External 1/8 G2 Autoloader MSL2024 MSL4048 MSL8096	External	HP SC44Ge Host Bus Adapter NOTE: Please visit: http://www.hp.com/go/connect for details about minimum SAS controller firmware version and SAS cabling requirements.	416096-B21
HP StorageWorks Fibre Tape Libraries, External MSL2024 MSL4048 MSL8096 MSL6000	External	Please consult the EBS connectivity matrix at: http://www.hp.com/go/ebs for detailed connectivity information	N/A
HP StorageWorks D2D Backup Systems D2D110 D2D120	External	Embedded Network Controller	N/A

Power Specifications

Operational Input Voltage Range (Vrms)	90Vac to 264Vac full range					
Frequency Range (Nominal) (Hz)	47 Hz to 63 Hz					
Nominal Input Voltage (Vrms)	100	115	200	220	230	240
Max Rated Output Wattage Rating	653.10	653.19	653.08	652.96	653.08	652.96
Nominal Input Current (A rms)	8.55	7.31	4.12	3.77	3.6	3.46
Max Rated Input Wattage Rating (Watts)	855	840.72	824.12	827.5	806.3	805.71
Max. Rated VA (Volt-Amp)	990	990	990	990	990	990
Efficiency (%)	76.39	77.69	79.25	78.91	81	81.04
Power Factor	0.998	0.997	0.983	0.976	0.973	0.969
Leakage Current (mA)	<3.5mA	<3.5mA	<3.5mA	<3.5mA	<3.5mA	<3.5mA
Maximum Inrush Current (A peak)	60A	60A	60A	60A	60A	60A
Maximum Inrush Current Duration (mS)	1mS	1mS	1mS	1mS	1mS	1mS

ProLiant DL160 G5 Fully Configured	115V/60Hz	220V/50Hz
Fully Loaded System Input Wattage (W)	651	638
Fully Loaded System Input Current (A rms)	5.7	3.0
Fully Loaded System Thermal (BTU- Hr)	2218	2174
Fully Loaded System VA (Volt-Amp)	657	657
System Leakage with all power supplies loaded (mA)	1.58	3.03
System Inrush Current with all power supplies loaded (A)	19	37
Power cord requirements	Nema 5-15P to IEC320-C13	IEC320-C13 to IEC320-C14

NOTE: Power shown is for a fully configured system consisting of (2) CPU, (8) double-sided DIMMs, (2) HDDs, (1) CD-ROM, and (2) PCI cards.

Power Cord AF556A

System Unit	Dimensions (H x W x D) (with bezel)	1.70 x 17.64 x 26.85 in (4.32 x 44.80 x 68.20 cm)	
	Weight (approximate)	All hard drives, power supplies, and processors installed	37.00 lb (16.78 kg)
	Input Requirements (per power supply)	Rated Line Voltage	90 to 140 VAC 180 to 264 VAC
		Rated Input Current	7.31A at 115VAC 3.6A at 230VAC
		Rated Input Frequency	47 to 63 Hz
		Rated Input Power	855W (at 100 VAC) 840.72W (at 200 VAC)
	Power Specifications	To review typical system power ratings use the Power Calculator which is available via the online tool located at URL: http://h30099.www3.hp.com/configurator/calc/Power%20Calculator%20Catalog.xls - Click on the system of interest. Example: DL380 G5 - Follow the instructions of the next screens.	
	Power Supply Output (per power supply)	Rated Steady-State Power	653.10W (at 100 VAC) 653.08W (at 200 VAC)
	System Inlet Temperature	Operating	50° to 95° F (10° to 35° C) at sea level with an altitude derating of 1.8°F per every 1000 ft (1.0°C per every 305 m) above sea level to a maximum of 10,000 ft (3050 m), no direct sustained sunlight. Maximum rate of change is 18°F/hr (10°C/hr). The upper limit may be limited by the type and number of options installed. System performance may be reduced if operating with a fan fault or above 86°F (30°C).
		Non-operating	40° to 140° F (-40° to 60° C) Maximum rate of change is 36°F/hr (20°C/hr)
	Relative Humidity (non-condensing)	Operating	10% to 85% relative humidity (Rh), 82.4°F (28°C) maximum wet bulb temperature, non-condensing.
		Non-operating	10% to 95% relative humidity (Rh), 101.7°F (38.7°C) maximum wet bulb temperature, non-condensing.
	Altitude	Operating	10,000 ft (3050 m). This value may be limited by the type and number of options installed. Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
		Non-operating	30,000 ft (9144 m). Maximum allowable altitude change rate is 1500 ft/min (457 m/min).
	Acoustic Noise	Listed are the declared A-Weighted sound power levels (LWAd) and declared average bystander position A-Weighted sound pressure levels (LpAm) when	

the product is operating in a 23°C ambient environment. Noise emissions were measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).

Idle	
LWAd	6.86
LpAm	52.36dBA
Operating	
LWAd	6.89
LpAm	52.60dBA

Embedded NC105i PCIe Gigabit Server Adapter	**Network Interface**	Integrated 10/100/1000BASE-T Transceiver Combines a triple-speed IEEE 802.3TM - Compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver.
	Data Transfer Method	Compliant to x1 PCIe Specification
	Network Transfer Rate	10Base-T (Half-Duplex) 10 Mb/s 10Base-T (Full-Duplex) 20 Mb/s 100Base-TX (Half-Duplex) 100 Mb/s 100Base-TX (Full-Duplex) 200 Mb/s 1000Base-TX (Half and Full-Duplex) 2000 Mb/s
	Connector	RJ-45 connector
	Cable Support	Performs all the physical layer functions for 10BASE-T, 100BASE-T, and 1000BASE-T Ethernet on standard Category 5 UTP

Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Technical Specifications

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For hard drives, 1 GB = 1 billion bytes. Actual formatted capacity is less.